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PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re application of

Keiji ONO, et al.

Docket No: Q63523

Appln. No.: 09/810,225

Group Art Unit: 1762

Confirmation No.: 6895

Examiner: Michael B. Cleveland

Filed: March 19, 2001

For: PROCESS FOR PRODUCING LIGHT-EMITTING PHOSPHOR

SUBMISSION OF APPEAL BRIEF

MAIL STOP APPEAL BRIEF - PATENTS
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Submitted herewith please find an Appeal Brief. A check for the statutory fee of $500.00 is attached. The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account. A duplicate copy of this paper is attached.

Respectfully submitted,

Jennifer M. Hayes
Registration No. 40,641

SUGHRUE MION, PLLC
Telephone: (202) 293-7060
Facsimile: (202) 293-7860

WASHINGTON OFFICE
23373
CUSTOMER NUMBER

Date: March 9, 2006

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APPEAL BRIEF UNDER 37 C.F.R. § 41.37

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P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

In accordance with the provisions of 37 C.F.R. § 41.37, Appellant submits the following:

Table of Contents

I. REAL PARTY IN INTEREST

The real party in interest is Sumitomo Chemical Company, Limited of Osaka, Japan.

II. RELATED APPEALS AND INTERFERENCES

Appellants, Appellants' legal representative and the Assignee of this application are not aware of any other appeals or interferences that will directly affect, or be affected by, or have a bearing on the Board's decision in the pending appeal.

III. STATUS OF CLAIMS

Claims 1, 3, 4 and 15 are before the Examiner and are rejected.

Claims 2 and 5 have been canceled.

Claims 6-14 are withdrawn from consideration.

This is an appeal from the Examiner's rejection of claims 1, 3, 4 and 15.

IV. STATUS OF AMENDMENTS

The Amendment submitted on April 8, 2004 is the last response submitted with amendments to the claims of the application. The Amendment filed on April 8, 2004 was entered. There are no outstanding amendments to the claims or to the specification in the present application.

V. SUMMARY OF THE CLAIMED SUBJECT MATTER

The present invention relates to a process for producing a vacuum ultraviolet ray-excited light-emitting phosphor having an excellent life property of maintaining light-emitting brilliance over time and to a phosphor paste. Particularly, the present invention relates to a process for producing a vacuum ultraviolet ray-excited light-emitting phosphor used in various light emitting type displays such as a plasma display panel (hereinafter "PDP") and the like and to a phosphor paste. The vacuum ultraviolet ray-excited light-emitting phosphor of the present invention is suitable as a material of a fluorescent surface of the display, Specification, page 1, lines 5-16.

The subject matter of the claims on appeal, claims 1, 3, 4 and 15, is directed to the process for producing a vacuum ultraviolet ray-excited light-emitting phosphor.

A PDP is a flat panel enabling large size images. PDP's are typically used for large screen televisions. Specification, page 1, lines 20-22.

A PDP element is made by placing a large number of fine discharging spaces (i.e., display cells) into matrix form and providing a discharge electrode in each display cell wherein a phosphor is applied on the inner wall of each cell. A rare gas such as He-Xe, Ne-Xe, Ar and the like is filled in the space in each cell. By applying voltage on a discharge electrode, a discharge of the rare gas occurs and a vacuum ultraviolet ray is radiated. The phosphor is excited by this vacuum ultraviolet ray and emits a visible ray. Images are displayed by allotting positions of display cells emitting light. By use of phosphors emitting three primary

Accordingly, an object of the present invention is to provide a process for producing a vacuum ultraviolet ray-excited light-emitting phosphor, having an excellent life property of light-emitting brilliance by vacuum ultraviolet ray excitation. Specification, page 3, lines 12-16.

As a result of the intense investigations to overcome the problems described above, the inventors have found that a phosphor obtained by mixing a phosphor with an aluminum-based coupling agent has an improved life property of light-emitting brilliance by vacuum ultraviolet ray-excited light-emitting phosphor. Based on these findings, the present invention was achieved. Namely, the present invention provides a process for producing a vacuum ultraviolet ray-excited light-emitting phosphor comprising the steps of mixing a phosphor with an aluminum-based coupling agent and calcining the mixture. Specification, page 3, lines 18-24.

The present invention is defined primarily by two independent claims on appeal, namely claims 1 and 15.

Claim 1 provides for a process for producing a vacuum ultraviolet ray-excited light-emitting phosphor comprising the steps of mixing an aluminate phosphor compound with a coupling agent comprising an aluminum compound, and calcining the mixture, wherein the coupling agent contains a 1, 3-diketone structure.

As recited in claim 3, depending on claim 1, the aluminate phosphor compound is $BaMgAl_{10}O_{17}$:Eu or $BaAl_{12}O_{19}$:Mn.

colors, blue, green and red, a full color display can be produced. Specification, page 1, line 23 to page 2, line 10.

Recently, there have been significant developments of phosphors for PDPs and rare gas lamps emitting light by utilizing vacuum ultraviolet rays radiated by rare gas discharge and the like. However, phosphors conventionally used for a vacuum ultraviolet ray-excited light-emitting device typically have an insufficient life property of light-emitting brilliance over time. Specification, page 2, lines 12-17.

As a method for improving the life property of light-emitting brilliance of a phosphor when excited by vacuum ultraviolet rays having constant strength, there is suggested a method for protecting the surface of a phosphor from plasma by coating the surface with a film of a metal oxide or with fine particles. For example, a process has been disclosed for coating the surface of a phosphor particle with a film of a metal oxide or with fine particles, by allowing a metal alkoxide to adhere to the surface of a phosphor particle followed by calcining. Specification, page 2, line 19 to page 3, line 4.

However, metal alkoxides have quick hydrolysis speed and it is difficult to form a metal alkoxide on the surface of a phosphor particle metal oxide film having uniform thickness or metal oxide fine particles having uniform particle size. Thus, the life property of light-emitting brilliance over time by vacuum ultraviolet ray excitation is not sufficient. Specification, page 3, lines 4-9.

As recited in claim 4, depending on claim 1 or 3, the content of the coupling agent is from 0.01 to 40 parts by weight based on 100 parts by weight of the phosphor.

Claim 15 provides for a process for producing a vacuum ultraviolet ray-excited light-emitting phosphor comprising the steps of mixing an aluminate phosphor compound with a coupling agent comprising an aluminum compound, and calcining the mixture.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

A. Sigai (US '124) and Bechtel et al (US '047) in view of each other

Claims 1, 3 and 15 are rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over US '124 and US '047 in view of each other.

In the Final Office Action dated August 5, 2005, as the ground for rejection of claims 1, 3, 4 and 15, the Examiner cites US '124 as teaching a method of mixing a manganese-doped zinc silicate phosphor with an aluminum oxide precursor and calcining to form an aluminum oxide coating wherein the precursor may be an acetylacetonate (i. e., a coupling agent with a 1,3 di-ketone structure). Although acknowledging that US '124 does not explicitly teach the use of aluminate phosphors, the Examiner asserts that US '124 demonstrates that the disclosed method is applicable to different phosphors that need protection.

The Examiner relies on US '047 for the teaching of aluminate phosphors that need protective coatings in order to increase their operative lifetimes. The Examiner recognizes that US '047 does not teach aluminum oxide coatings, but takes the position that it would have been obvious to one of ordinary skill in the art to use the method of US '124 to coat the aluminate phosphors of US '047 because US '047 teaches that the aluminate phosphors benefit from coatings that increase their lifetime, and US '124 teaches coatings that extend phosphor lifetimes by protecting the phosphors from moisture.

B. Kasenga et al (US '707) in view of Mizuta et al (US '564) and Bechtel et al (US '047)

Claims 1, 3-4 and 15 are rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Kasenga et al (US '707) in view of Mizuta et al (US '654) and Bechtel et al (US '047).

As the grounds for rejection of claims 1, 3 and 15, the Examiner relies on US '707 for the disclosure of mixing a manganese-doped silicate phosphor with aluminum nitrate and firing (i.e., calcining) to form an aluminum oxide coating.

The Examiner recognizes that US '707 does not teach the use of an aluminum 1,3-diketone coupling agent as the precursor. However, the Examiner asserts that the equivalence of nitrates to other precursors, including acetylacetonates (which have a 1,3,-diketone), as precursors to form metal oxides is well known. Thus, it is the Examiner's position that it would have been obvious to one of ordinary skill in the art to have used an aluminum acetylacetonate instead of an aluminum nitrate with a reasonable expectation of success and with the expectation of similar results because acetylacetonates are known equivalents to nitrates as metal oxide precursors.

Further, the Examiner recognizes that US '707 and US '654 do not explicitly teach the use of their methods to coat aluminate phosphors. However, the Examiner relies on US '047 for teaching that such phosphors benefit from protective coatings. It is the Examiner's position that it would have been obvious to one of ordinary skill in the art to use the method of US '707 and US '654 to coat the aluminate phosphors of US '047 because US '047 teaches that the

aluminate phosphors benefit from coatings that increase their lifetime and US '707 and US '654 teach coatings that extend phosphor lifetimes.

With respect to claim 4, the Examiner relies on US '707 for the teaching that the concentration of aluminum ions is critical for sufficient absorption of the aluminum (column 2, lines 11-12). The Examiner asserts that the concentration is modified by changing the weight of the precursor in the solutions to which the same amount of phosphor is added (i.e., by controlling the ratio of the weight of the precursor to that of the phosphor) based on the disclosure at column 2, lines 45-68. It is the Examiner's position that it would have been obvious to one of ordinary skill in the art to optimize the weight ratio of aluminum acetylacetonate to the phosphor as a matter of routine experimentation to achieve sufficient adsorption.

VII. ARGUMENT

A. Grouping of the Claims

Claims 1, 3 and 4 stand or fall together for purposes of this appeal only.

Claim 15 is separately patentable from claims 1, 3 and 4 for the reasons set forth herein.

B. Sigai (US '124) and Bechtel et al (US '047) in view of each other does not render the claimed invention obvious.

Claims 1, 3 and 15 are rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over US '124 and US '047 in view of each other.

(i) Reason for Rejection

As the ground for rejection of claims 1, 3, 4 and 15, the Examiner cites US '124 as teaching a method of mixing a manganese-doped zinc silicate phosphor with an aluminum oxide precursor and calcining to form an aluminum oxide coating; the precursor may be an acetylacetonate (i. e., a coupling agent with a 1,3 di-ketone structure). Although acknowledging that US '124 does not explicitly teach the use of aluminate phosphors, the Examiner asserts that US '124 demonstrates that the disclosed method is applicable to different phosphors that need protection.

The Examiner relies on US '047 for the teaching of aluminate phosphors that need protective coatings in order to increase their operative lifetimes. The Examiner recognizes that US '047 does not teach aluminum oxide coatings, but takes the position that it would have been obvious to one of ordinary skill in the art to use the method of US '124 to coat the

aluminate phosphors of US '047 because US '047 teaches that the aluminate phosphors benefit from coatings that increase their lifetime, and US '124 teaches coatings that extend phosphor lifetimes by protecting the phosphors from moisture.

(ii) Appellants' Position

US '124 and US '047 do not teach or suggest the claimed invention as recited in claims 1 and 15 and therefore do render the claimed invention obvious.

The present invention provides a process for producing a vacuum ultraviolet ray-excited light-emitting phosphor comprising the steps of mixing an aluminate phosphor compound with a coupling agent comprising an aluminum compound, and calcining the mixture as recited in claim 15. The coupling agent contains a 1, 3-diketone structure as recited in claim 1.

In the process of the present invention, a coupling agent comprising an aluminum compound or a coupling agent comprising an aluminum compound having a 1, 3-diketone structure is used as a raw material. The coupling agent can be distributed uniformly without forming a precipitate of an aluminum compound since the hydrolysis speed thereof is extremely high. See page 6, lines 8-11 of the present specification.

According to the process of the invention, a vacuum ultraviolet ray-excited light-emitting phosphor having an excellent life property of maintaining light-emitting brilliance over time is obtained. See page 6, lines 16-18 and page 8, lines 21-25 of the present invention and Example 1.

The Examiner asserts that US '124 teaches mixing a manganese-doped zinc silicate phosphor with an aluminum oxide precursor and calcining to form an aluminum oxide coating, and that the precursor may be an acetylacetonate. The Examiner further asserts that US '047

teaches aluminate phosphors that need protective coatings in order to increase their operative lifetimes. It is the Examiner's position that it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used the method of US '124 to coat the aluminate phosphors of US '047. See paragraph 8 of the Final Office Action dated August 5, 2005.

Appellants respectfully submit that the rejection should be reversed because the Examiner has not made a *prima facie* showing of obviousness. A *prima facie* showing of obviousness requires (1) a suggestion or motivation in the references or in the knowledge of one of ordinary skill in the art, to modify the references or to combine reference teachings; (2) a reasonable expectation of success; and (3) a teaching or suggestion of all claimed limitations. *See Hodesh v Block Drug Co*, 786 F.2d 1136, 1153, n.5, 229 USPQ 182, 187, n.5 (Fed. Cir. 1986); *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 1438 (Fed. Cir. 1991); and *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). Further in determining the difference between the claimed invention and the prior art, the proper inquiry is whether the invention as a whole would have been obvious and not whether the differences themselves would have been obvious. MPEP § 2141.02(I) citing *Stratoflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1530, 218 USPQ 871 (Fed. Cir. 1983); *Schenk v. Nortron Corp.*, 713 F.2d 782, 218 USPQ 698 (Fed. Cir. 1983).

In the present case, the Examiner acknowledges that US '124 does not teach the use of aluminate phosphors and that US '047 does not teach aluminum oxide coatings. Additionally, the Examiner has not properly identified a teaching or suggestion in the prior art which may

have served as motivation for one of ordinary skill in the art to combine the cited references with a reasonable expectation of achieving the claimed invention as a whole. Instead the Examiner has compared individual element in the claims to the prior art and asserts obviousness of the elements as opposed to the claimed invention as a whole. The Examiner is saying, in effect, that it is obvious to try various phosphors in the process of US '124 or to try various coatings for the aluminate phosphors of US '047 so as to determine optimum conditions. However, Appellants respectfully submit that the applicable law is to the contrary. The law states that it is not a valid basis for rejecting a claim under 35 U.S.C. § 103(a) that it was obvious to try variations to find optimum conditions. *See, e.g., In re Sigco*, 36 USPQ2d 1380, 1382 (Fed. Cir. 1995) (citing *In re Dow Chem. Co.*, 837 F.2d 469, 473, 5 USPQ2d 1521, 1532 (Fed. Cir. 1988) (rejecting the "obvious to try" standard)); *In re Deuel*, 34 USPQ2d 1210, 1216 (Fed. Cir. 1995) ("'obvious to try' has long been held not to constitute obviousness").

Appellants have pointed out that US '047 does not teach or suggest coatings that react with the aluminate phosphors and therefore, one of ordinary skill in the art would not have been motivated to modify or combine the references as suggested by the Examiner.

US '124 teaches a method for improving lumen maintenance of fluorescent lamps comprising the steps of depositing a continuous aluminum oxide coating on individual particles of a finely-divided fluorescent lamp phosphor powder to form individually and continuously coated phosphor particles. Column 1, line 68 to column 2, line 5. The coating is obtained by reacting an aluminum containing precursor material deposited on the surface of phosphor powder particles to form aluminum oxide. Column 3, lines 42-46. Aluminum acetylacetonates

are disclosed as examples of suitable precursors of the aluminum-containing compounds. Column 3, lines 47-49.

On the other hand, US '047 specifically teaches a coating material including catena-polyphosphates that do not react with the UV phosphors to achieve a coating that is not subject to degeneration when the UV-phosphor is excited by UV-radiation due to the inability of the catena-polyphosphates to react with the UV-phosphors. Col. 1, lines 33-37. Thus, the two references employ different types of coating materials.

Further, the different types of coating material are used for different purposes. US '124 describes that one of the primary causes of the drop-off in fluorescent lamps during operation is the formation of mercury compounds on the surface of the phosphor coating. See column 1, lines 15-53. Thus, US '124 provides a method for improving lumen maintenance of fluorescent lamps and an improved fluorescent lamp phosphor, which is an aluminum-containing precursor coated silicate phosphor, in order to solve the problems described above.

US' 047 describes that a decrease of the phosphor efficiency in a plasma display occurs with excitation time. See column 1, lines 25-29. Thus, US '047 provides a phosphor composition of an UV-phosphor with a coating that is not subject to degeneration under UV-radiation. See column 1, lines 33-37. Additionally, it is disclosed that plasma display includes a noble gas or noble gas mixture, not mercury, as a discharge gas. See column 1, lines 10-11. Accordingly, a mercury compound is not formed as in the process of US '124. Therefore, the problem to be solved in US '047 is not the same as that of US '124. Thus, the two types of

coating materials are employed for different purposes and one of ordinary skill in the art would not have been motivated to substitute one coating material for the other.

Additionally, US '047 teaches away from the use of coatings that react with the phosphor substrate. The object of US '047 is to provide a coating which is not subject to degeneration when the phosphor is excited by UV-radiation. Column 1, lines 35-37. This object is achieved by using anhydrous catena-polyphosphates which form a hard water insoluble coating on the phosphor particles and do not react with the UV-phosphors such that even when the catena-polyphosphates are exposed to radiation, they do not degrade like the aluminate phosphors. Column 1, lines 44-60. Therefore, US '047 teaches away from a coupling agent that would react with an aluminate phosphor as in US '124 and in the present invention. Therefore, it follows that, based on the teachings of the references, one of ordinary skill in the art would not have been motivated to modify or combine US '047 with US '124 and to employ a coupling agent comprising an aluminum compound as an aluminum oxide precursor to form an aluminum oxide coating on an aluminate phosphor, as provided for in present claim 15, much less to employ a coupling agent comprising an aluminum compound with a 1, 3-diketone structure as provided for in present claim 1. Thus, the Examiner has not established a *prima facie* showing obviousness with respect to the claimed invention.

In the Advisory Action dated December 29, 2005, the Examiner states that Applicants' argument that the anhydrous catena-polyphosphate coating materials of US '047 do not react with the UV phosphors is not convincing because US '047 does not contain a statement of

inoperability necessary to rise to the level of "teaching away" from the claimed invention and because the present claims do not require a reaction with the substrate.

Appellants respectfully disagree with the Examiner's statement indicating that there must be a statement of inoperability in the reference in order for the reference to be considered as teaching away from the claimed invention. This is not the law. The test for obviousness is what the combined teachings of the references would have suggested to those of ordinary skill in the art and the proper inquiry is whether the prior art as a whole suggests the *desirability* of the claimed invention. See MPEP § 2143.01(1) and (II). A disclosure which criticizes, discredits, or otherwise discourages the claimed invention may be a sufficient teaching away to establish nonobviousness of a claimed invention. See MPEP § 2143.02(VI) quoting *In re Fulton*, 391 F.3d 1195, 1201, 73 USPQ2d 1141, 1146 (Fed.Cir. 2004).

In applying these legal principles, Appellants submit that the Examiner has not met his initial burden of providing some suggestion of the desirability of combining or modifying the teachings in the prior art to arrive at the claimed invention. As the Examiner admits, US '124 does not teach or suggest the use of aluminate phosphors and US '047 does not teach or suggest aluminum oxide coatings. Further, as discussed above, there is no suggestion of the *desirability* in the prior art of employing a coupling agent comprising an aluminum compound to coat aluminate phosphors. The simple fact that US '047 teaches that aluminate phosphors benefit from coatings that increase their lifetime does not mean that one of ordinary skill in the art would have selected a coupling agent comprising an aluminum compound as the coating material as in present claim 15, much less a coupling agent comprising an aluminum

compound with a 1, 3-diketone structure as in present claim 1, particularly in view of the teaching away from compounds that react with UV-phosphors to achieve the desired effect of a coating that is not subject to degeneration when the UV-phosphor is excited by UV-radiation.

The test for obviousness is what the combined teachings of the references would have suggested to one of ordinary skill in the art. Further, the Examiner must weigh the suggestive power of each reference. *In re Young*, 927 F.2d 588 (Fed. Cir. 1991). In this regard, US '047 implies that a coating material that does not react with the UV-phosphors provides advantages over coating materials that do react with UV-phosphors such that one of ordinary skill in the art would not be motivated to employ a coating material that would react with the UV-phosphor with a reasonable expectation of achieving the effects and advantages taught by US '047.

In view of the above, Appellants submit that US '124 and US '047, taken alone or in combination, do not teach or suggest mixing an aluminate phosphor with a coupling agent to forma coating that reacts with the aluminate phosphor as in the present invention and therefore the rejection should be reversed.

B. Kasenga et al (US '707) in view of Mizuta et al (US '564) and Bechtel et al (US '047)

Claims 1, 3-4 and 15 are rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Kasenga et al (US '707) in view of Mizuta et al (US '654) and Bechtel et al (US '047).

As the grounds for rejection of claims 1, 3 and 15, the Examiner relied on US '707 for the disclosure of mixing a manganese-doped silicate phosphor with aluminum nitrate and firing (i.e., calcining) to form an aluminum oxide coating.

The Examiner recognizes that US '707 does not teach the use of an aluminum 1,3-diketone coupling agent as the precursor. However, the Examiner asserts that the equivalence of nitrates to other precursors, including acetylacetonates (which have a 1,3,-diketone), as precursors to form metal oxides is well known. Thus, it is the Examiner's position that it would have been obvious to one of ordinary skill in the art to have used an aluminum acetylacetonate instead of an aluminum nitrate with a reasonable expectation of success and with the expectation of similar results because acetylacetonates are know equivalents to nitrates as metal oxide precursors.

Further, the Examiner recognizes that US '707 and US '654 do not explicitly teach the use of their methods to coat aluminate phosphors. However, the Examiner relies on US '047 for teaching that such phosphors benefit from protective coatings. It is the Examiner's position that it would have been obvious to one of ordinary skill in the art to use the method of US '707 and US '654 to coat the aluminate phosphors of US '047 because US '047 teaches that the

aluminate phosphors benefit from coatings that increase their lifetime and US '707 and US '654 teach coatings that extend phosphor lifetimes.

With respect to claim 4, the Examiner relies on US '707 for the teaching that the concentration of aluminum ions is critical for sufficient absorption of the aluminum and that the concentration is modified by changing the weight of the precursor in the solutions to which the same amount of phosphor is added (i.e., by controlling the ratio of the weight of the precursor to that of the phosphor). The Examiner asserts that it would have been obvious to one of ordinary skill in the art to have optimized the weight ratio of aluminum acetylacetonate to the phosphor as a routine matter to have assured sufficient adsorption.

(ii) Appellants' Position

US '707, US '564 and US '047, whether taken alone or in combination, do not teach or suggest the claimed invention as recited in claims 1 and 15 and therefore do not render the claimed invention obvious.

The present invention provides a process for producing a vacuum ultraviolet ray-excited light-emitting phosphor comprising the steps of mixing an aluminate phosphor compound with a coupling agent comprising an aluminum compound, and calcining the mixture as recited in claim 15. The coupling agent contains a 1, 3-diketone structure as recited in claim 1.

The Examiner admits that US '707 and US '654 do not teach methods for coating aluminate phosphors.

Applicants submit that US '707 does not teach coating an aluminate phosphor and does not teach using an aluminum compound having a 1,3-diketone structure. US '707 discloses several various examples of metal compounds (col. 2, lines 18-31), but there is no teaching or

suggestion that a nitrate is equivalent to a 1,3-diketone or that a 1,3-diketone should be selected instead of nitrate.

US' 654 does not teach coating an aluminate phosphor and is non-analogous art. US '654 is directed to a superconductive material and is in a different technical field from US '707. Further, US '654 does not teach or suggest using a 1,3-diketone in place of nitrate. Thus, one of ordinary skill in the art would not have been motivated to combine the references as suggested by the Examiner.

US '047 teaches coating aluminate phosphors, but does not suggest the use of a coupling agent comprising an aluminum compound as the coating precursor as recited in claim 15, much less an aluminum compound having a 1,3-diketone structure as recited in claim 1. Even further, neither one of US '707 , US '654 and US '047 teaches or suggests mixing an aluminate phosphor with a coupling agent to react with the phosphor substrate as in the present invention. US '707 teaches that the aluminum ions are adsorbed on the surface of the manganese activated zinc silicate, US '654 teaches a superconductive material including a substrate and a superconductive layer of a double oxide of metals provided on the surface of the substrate and is not related to the present invention, and US '047 teaches that the catena-polyphosphates of the coating do not react with the UV-phosphors as discussed above. Thus, one of ordinary skill in the art would not have been motivated to combine the disclosures of US '707, US '654 and US '047 with a reasonable expectation of success in achieving the claimed invention since neither reference teaches mixing an aluminate phosphor with a coupling agent as recited in both claims 1 and 15.

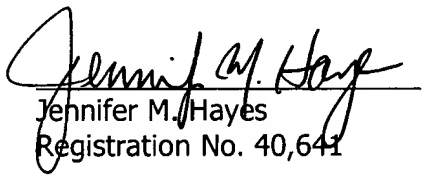
Accordingly, the obviousness rejection should be reversed.

C. Conlcusion

Unless a check is submitted herewith for the fee required under 37 C.F.R. §41.37(a) and 1.17(c), please charge said fee to Deposit Account No. 19-4880.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



Jennifer M. Hayes
Registration No. 40,641

SUGHRUE MION, PLLC
Telephone: (202) 293-7060
Facsimile: (202) 293-7860

WASHINGTON OFFICE
23373
CUSTOMER NUMBER

Date: March 9, 2006

CLAIMS APPENDIX

CLAIMS 1, 3, 4 and 15 ON APPEAL:

1. (previously presented): A process for producing a vacuum ultraviolet ray-excited light-emitting phosphor comprising the steps of

mixing an aluminate phosphor compound with a coupling agent comprising an aluminum compound, and calcining the mixture, wherein the coupling agent contains a 1, 3-diketone structure.

3. (previously presented): The process for producing a vacuum ultraviolet ray-excited light-emitting phosphor according to Claim 1, wherein the aluminate phosphor compound is $BaMgAl_{10}O_{17}$:Eu or $BaAl_{12}O_{19}$:Mn.

4. (previously presented): The process for producing a vacuum ultraviolet ray-excited light-emitting phosphor according to Claim 1 or 3, wherein the content of the coupling agent is from 0.01 to 40 parts by weight based on 100 parts by weight of the phosphor.

15. (previously presented): A process for producing a vacuum ultraviolet ray-excited light-emitting phosphor comprising the steps of

mixing an aluminate phosphor compound with a coupling agent comprising an aluminum compound, and calcining the mixture.

EVIDENCE APPENDIX:

Pursuant to 37 C.F.R. § 41.37(c)(1)(ix), submitted herewith are copies of any evidence submitted pursuant to 37 C.F.R. §§ 1.130, 1.131, or 1.132 or any other evidence entered by the Examiner and relied upon by Appellant in the appeal.

None.

RELATED PROCEEDINGS APPENDIX

Submitted herewith are copies of decisions rendered by a court or the Board in any proceeding identified about in Section II pursuant to 37 C.F.R. § 41.37(c)(1)(ii).

None.